

APC Back-UPS Pro[®]

Uninterruptible Power Source
Onduleur
Sistema de Alimentación Ininterumpible

User's Manual

Manuel
d'utilisateur

Manual de
Usario

120VAC

280, 420, 650,
1000, 1400



APC
AMERICAN POWER CONVERSION

Contents/Sections/Indice

English	1
Français	19
Español	39

Please note: The troubleshooting section (section 8) offers solutions for most of the difficulties you may encounter with this UPS. Before calling customer service, please have available your UPS's serial number (see label on the rear of the UPS). A returned materials authorization (RMA) number is required for all return shipments to APC. Do not send return shipments to APC without an RMA number. See section 9.

Veuillez noter : La section «En cas de problème» (section 8) offre des solutions pour la plupart des difficultés rencontrées lors de l'utilisation de l'onduleur. Si vous appelez notre service clientèle, veuillez avoir à portée de main le numéro de série de votre onduleur (sur l'étiquette située sur le panneau arrière de l'onduleur). Un numéro d'autorisation de retour de marchandise (RMA) est nécessaires pour tous les renvois à APC (les conditions de service et d'intervention varient selon les pays. Veuillez contacter votre agence APC pour tout renseignement sur les spécificités relatives à votre pays). Ne renvoyez aucun appareil à APC sans ce numéro. Reportez-vous à la section 9.

Sírvase tomar nota: La sección de detección y solución de problemas (sección 8) ofrece soluciones para la mayoría de las dificultades que puede usted encontrar con este UPS. Antes de llamar a servicio al cliente, sírvase tener disponible su número de serie del UPS (verlo en la etiqueta en la parte posterior del UPS). Se requiere un número de autorización de devolución de materiales (RMA) para todos los envíos de devolución a APC. No envíe despachos de devolución a APC sin un número RMA. Vea la sección 9.

Serial number:/Numéro de série:/Número de serie: _____

Toll free technical support:

Numéro vert de l'assistance technique:

Número de teléfono sin costo para apoyo técnico:

United States and Canada 1-800-800-4272

Ireland 1-800-702000

U. K. 0800-132990

Others/Autres/Otras:

+1 401 789 5735 (USA) or

+353 91 702020 (Ireland)

Return shipment addresses:

Adresse d'expédition des renvois :

Direcciones para devolver mercadería:

American Power Conversion Corporation

132 Fairgrounds Road

P. O. Box 278

West Kingston, Rhode Island 02892

USA

American Power Conversion Corporation

(A. P. C.) b. v.

Ballybritt Business Park

Galway

Ireland

Entire contents copyright © 1995 American Power Conversion. All rights reserved; reproduction in whole or in part without permission is prohibited. Back-UPS Pro is a trademark of APC. All other trademarks are the property of their respective owners.

English

Français

Español

Please note: The troubleshooting section (section 5) offers solutions for most of the difficulties you may encounter with the UPS. Before calling customer service, please have available your UPS's serial number (see the label on the rear of the UPS). A printed materials subscription (USA) number is required for all return ship-ments to APC. Do not send return shipments to APC without an RMA number (see section 7).

Veillez noter : La section « Les problèmes » (section 5) offre des solutions pour la plupart des difficultés rencontrées lors de l'utilisation de l'onduleur. Si vous souhaitez notre service clientèle, veuillez avoir à portée de main le numéro de série de votre onduleur (sur l'étiquette située sur le panneau arrière de l'onduleur). Un numéro d'abonnement de journaux de marchandises (USA) est nécessaire pour tous les retours à APC. Les envois de retour et d'intervention varient selon les pays. Veuillez contacter votre agence APC pour tous renseignements sur les procédures relatives à votre pays. Les retours seront acceptés à APC sans enregistrement préalable : voir la section 7.

Bitte beachten: Bitte lesen Sie die Beschreibung der Probleme (Abschnitt 5) für die meisten Schwierigkeiten, die bei der Benutzung des UPS auftreten können. Bevor Sie unsere Kundendienst-Abteilung anrufen, haben Sie bitte die Seriennummer des UPS (besonders auf der Rückseite des UPS) zur Hand. Sie benötigen eine Abonnementnummer für den Versand von UPS-Gütern zurück zu APC. Bitte kontaktieren Sie Ihre APC-Agentur für alle Informationen zu den Verfahrensvorgängen für Ihren Land. Die Rücksendungen werden von APC ohne Registrierung angenommen. Siehe Abschnitt 7.

United States and Canada		Other Areas/Other	
1-800-850-4375	133 Folger Road	1-800-850-4375	133 Folger Road
1-800-703000	P.O. Box 178	1-800-703000	P.O. Box 178
800-733900	Van Nuys, CA 91411-2292	800-733900	Van Nuys, CA 91411-2292
	USA		USA
	American Power Conversion Corporation		American Power Conversion Corporation
	(A.P.C.) S.A.		(A.P.C.) S.A.
	Bellvue Business Park		Bellvue Business Park
	Wayne		Wayne
	Michigan		Michigan

Part Number 990-2012-C

Revised 10/95

Limited Warranty

American Power Conversion (APC) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from APC or an APC service center. Products must be returned to APC or an APC service center with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment which has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL APC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise.

Garantie limitée

American Power Conversion (APC) garantit ce produit contre tout vice de matière ou de fabrication pendant une période de deux ans à compter de la date d'achat. Son obligation sous cette garantie est limitée à la réparation ou au remplacement, selon son propre et seul choix, desdits produits défectueux. Pour faire réparer votre produit dans le cadre de sa garantie, vous devez obtenir une autorisation de retour de marchandise (numéro de RMA) de la part d'APC ou de l'un de ses centres de réparations. Les produits doivent être retournés à APC ou à l'un de ses centres de réparation port payé et doit être accompagné d'une brève description du problème rencontré ainsi qu'une preuve de la date et de l'endroit de l'achat. Cette garantie ne s'applique pas aux appareils ayant été endommagés par accident, négligence ou application incorrecte ou qui ont été changés ou modifiés de quelque façon que ce soit. Cette garantie s'applique exclusivement à l'acheteur d'origine qui doit avoir enregistré de manière adéquate le produit dans les 10 jours suivant la date d'achat.

À L'EXCEPTION DE CE QUI EST INDIQUÉ DANS LA PRÉSENTE, AMERICAN POWER CONVERSION N'ÉMET AUCUNE GARANTIE, EXPLICITE OU IMPLICITE, ET NOTAMMENT AUCUNE GARANTIE DE COMMERCIALISATION ET D'ADAPTATION À UN OBJECTIF SPÉCIFIQUE. Certains États n'autorisant pas les limites ou les exclusions des garantie implicites, il est possible que la (les) limite(s) ou l'exclusion (les exclusions) citées ci-dessus ne s'appliquent pas à certains acheteurs.

À L'EXCEPTION DE L'ÉNONCÉ CI-DESSUS, EN AUCUN CAS APC NE SERA TENU RESPONSABLE DES DOMMAGES DIRECTS, INDIRECTS, FORTUITS OU CONSÉCUTIFS SURVENUS EN RAISON DE L'UTILISATION DE CE PRODUIT, MÊME SI ELLE A ÉTÉ AVERTIE DE LA POSSIBILITÉ DE CES DOMMAGES.

En particulier, APC n'est responsable d'aucun frais, y compris les pertes de profit et de revenue, la perte d'équipement et d'utilisation de ce dernier, la perte de logiciel, la perte de données, les coûts de substitution, les plaintes de tierces parties et autres.

Garantía Limitada

American Power Conversion (APC) garantiza que sus productos están libres de defectos de materiales y mano de obra por un período de 2 años desde la fecha de compra. Su obligación bajo esta garantía esta limitada a reparar o reemplazar, a su opción, cualquier producto defectuoso. Para obtener servicio de acuerdo a la garantía, debe usted obtener un número de Autorización de Material Retornado (RMA) de APC o de un centro de servicio APC. Los productos deben ser retornados a APC o a un centro de servicio de APC con los costos de transporte pagados por adelantado y deben estar acompañados con una breve descripción del problema encontrado y prueba de fecha y lugar de compra. Esta garantía no se aplica a equipo que ha sido dañado por accidente, negligencia o mala aplicación o ha sido alterado o modificado en alguna forma. Esta garantía se aplica solamente al comprador original que debe haber registrado debidamente el producto dentro de los 10 días de la compra.

CON EXCEPCION DE LO QUE AQUI SE INDICA, AMERICAN POWER CONVERSION NO OFRECE NINGUNA GARANTIA EXPRESA O IMPLICITA INCLUYENDO GARANTIAS DE COMERCIALIZACION O DE ADECUACION PARA UN PROPOSITO PARTICULAR. Algunos estados no permiten limitaciones o exclusión de las garantías implícitas por tanto las limitaciones anteriores o exclusiones pueden no ser aplicables al comprador.

CON EXCEPCION DE LO QUE SE INDICA ARRIBA, EN NINGUN CASO APC SERA RESPONSABLE POR DAÑOS Y PERJUICIOS DIRECTOS, INDIRECTOS O ESPECIALES E INCIDENTALES O CONSECUENTES RESULTANTES DEL USO DE ESTE PRODUCTO, AUN SI SE LE AVISA DE LA POSIBILIDAD DE DICHOS DAÑOS O PERJUICIOS.

Específicamente, APC no es responsable por cualquier costo, tal como pérdida de utilidades o de ingresos, pérdida de equipo, pérdidas del uso del equipo, pérdida de software, pérdidas de información, costo de sustitutos, reclamos por terceras personas o cualesquiera otros.

1. Introduction	1
2. Safety	3
3. Presentation	4
4. Installation	5
5. Operation	8
6. Alarms	9
7. Options	9
8. Troubleshooting	10
9. Service	11
10. Battery Replacement	12
11. Storage	14
12. Specifications	15
13. How to Determine On-battery Run Time	17

1. Introduction

1.1 Thank you!

Thank you for selecting this uninterruptible power source (UPS). It is designed for many years of reliable, maintenance-free service.

Important safety instructions!!

Please read this manual. It provides safety, installation, and operating instructions that should be followed during installation and maintenance of the UPS and batteries. It will help you get the fullest performance and service life from your UPS. This manual describes the inner workings of the UPS and how they relate to providing superior protection from utility power problems such as blackouts, brownouts, sags, swells, EMI/RFI noise, and surges. Also included are instructions for obtaining factory service, if necessary.

If you have a problem with the UPS, please refer to this manual before calling customer service. The troubleshooting section (section 8) can help with most situations typically encountered when using the UPS.

Please save the packaging materials!

The UPS's shipping materials are designed with great care to provide protection during shipping. These materials are invaluable if you ever have to return the UPS for service. Damage sustained during transit is not covered under the warranty.

1.2 Radio Frequency Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

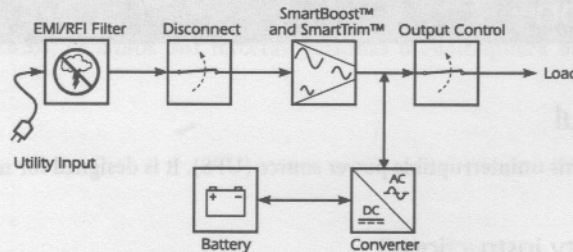
However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- increase the separation between the equipment and the receiver
- connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- consult the dealer or an experienced radio/TV technician for help.

Shielded communications interface cables must be used with this product.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.3 Theory of Operation



This high-performance, line-interactive, uninterruptible power source (UPS) provides clean, reliable, AC power to computer systems — protecting them from power blackouts, brownouts, swells, sags, surges, and interference.

Normally, the UPS operates “on-line,” supplying power from the utility input to the load (workstation, server, or other device). The converter circuitry is used to maintain an optimal float charge level on the battery.

When the utility fails, the disconnect switch opens and the converter supplies AC power to the load. The loads operate normally until shut down or until the battery is exhausted. The UPS automatically transfers the load back to utility power and recharges the batteries when the line voltage returns to normal.

The UPS also provides surge protection and EMI/RFI filtering, as well as SmartBoost™ and SmartTrim™ automatic voltage regulation, which corrects high and low input voltage without drawing power from the battery.

Output control uses the UPS's remote interface to turn the load on or off, without disabling other UPS functions.

1.4 Features

CellGuard™ Intelligent Battery Management

The UPS provides visual and audible indications of the battery's status including low battery and replace battery conditions.

The UPS exercises the battery during its self-test, and will detect a weak battery before it is put into service. The UPS normally performs a self-test at power up and every 14 days thereafter. Self-tests can also be conducted manually with the on/off button at any time. See section 5.2.

The UPS features user-replaceable hot-swappable batteries. Batteries can be replaced without having to remove power from the loads or send the UPS in for service.

Power Management Software

This UPS offers advanced features when connected via the computer interface to a device using power management software.

Telephone Line and Network Surge Protection

This UPS provides advanced single telephone line or 10Base-T network surge suppression through the modular connectors on the back panel. See section 4.

2. Safety

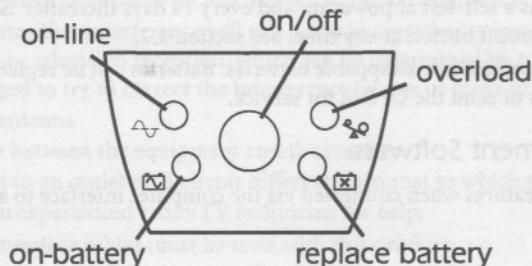


CAUTION!

- To reduce the risk of electric shock in conditions where load equipment grounding cannot be verified, disconnect the UPS from the AC power outlet before installing a computer interface or accessory slot signal cable. Reconnect the power cord only after all signaling connections are made.
- Connect the UPS to a two-pole, three-wire grounding AC power outlet. The receptacle must be connected to appropriate branch protection (fuse or circuit breaker). Connection to any other type of receptacle may result in a shock hazard and violate local electrical codes.
- The UPS has an internal energy source (the battery). **The output may be energized when the unit is not connected to an AC power outlet.**
- To deenergize the outputs of the UPS:
 1. If the UPS is on press the on/off button to switch the UPS off.
 2. Disconnect the UPS from the AC power outlet.
 3. To deenergize the UPS completely, disconnect the battery. See section 10.
- Never install telephone wiring during a lightning storm.
- Use of this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly effect its safety or effectiveness is not recommended.

3. Presentation

3.1 Front panel



Press the **on/off** button with the UPS plugged in to turn the UPS on or off. See Sec. 5.1.

On/off also activates the UPS's self-test. See section 5.2.

The **overload** LED illuminates when the loads connected to the UPS exceed the UPS's power capacity. See section 6.2.

The **replace battery** LED illuminates when the UPS's battery is no longer useful and must be replaced. See section 10.

The **on-battery** LED illuminates when the UPS is supplying battery power to the loads.

The **on-line** LED means that filtered utility line is passing through the UPS to your equipment.

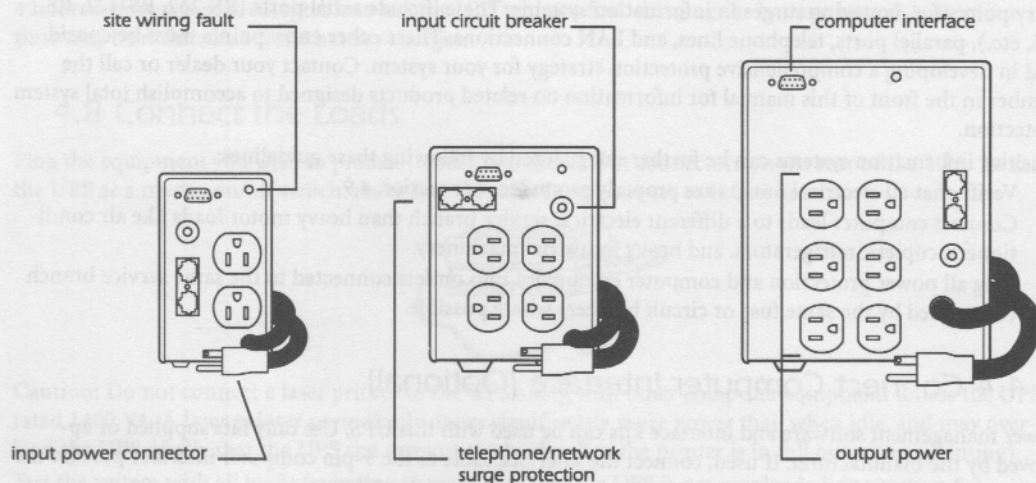
The **input power connector** is a power cord with a NEMA 5-15P connector.

The **output power receptacles** are NEMA 5-15R type.

The RJ-45/RJ-11 modular combination is used for telephone/network surge protection with single telephone lines and 10Base-T networks. See section 4.5.

The **computer interface port** is for UPS monitoring and control. See section 4.4.

3.2 Rear Panel



The **site wiring fault indicator** illuminates when the UPS is connected to an improperly wired AC power outlet. See section 4.9.

The **input circuit breaker** trips when loads exceed the UPS's capacity. The resettable center plunger of the circuit breaker extends when tripped.

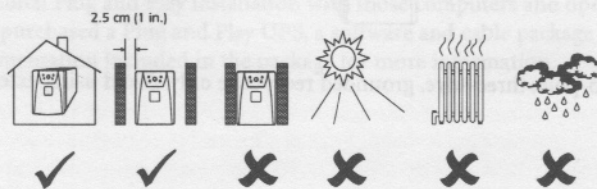
4. Installation

Please fill out and return the warranty registration card now.

4.1 Inspection

Inspect the UPS upon receipt. Notify the carrier and dealer if there is damage. The packaging is recyclable; save it for reuse or dispose of it properly.

4.2 Placement



Install the UPS in a protected area with adequate air flow that is free of excessive dust. Do not operate the UPS where the temperature and humidity is outside the specified limits. See section 12. Allow the UPS to come to room temperature before continuing.

4.3 Protection Strategies

This UPS provides high performance power line protection to the loads. There are, however, other potential entry points for damaging surges in information systems. These include serial ports (RS-232, RS-422, RS-485, etc.), parallel ports, telephone lines, and LAN connections. These other entry points must be considered in developing a comprehensive protection strategy for your system. Contact your dealer or call the number in the front of this manual for information on related products designed to accomplish total system protection.

Sensitive information systems can be further safeguarded by following these guidelines:

- Verify that all electrical outlets are properly grounded. See section 4.9.
- Connect computer leads to a different electrical service branch than heavy motor loads like air conditioners, copiers, refrigerators, and heavy industrial machinery.
- Plug all power protection and computer equipment into outlets connected to the same service branch (controlled by the same fuse or circuit breaker) where possible.

4.4 Connect Computer Interface (Optional)

Power management software and interface kits can be used with this UPS. Use only kits supplied or approved by the manufacturer. If used, connect the interface cable to the 9-pin computer interface port on the back panel of the UPS. Secure the connector's screws to complete the connection.

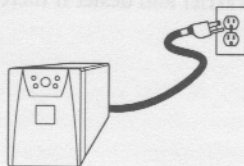
Note: Computer interface connection is optional. The UPS works properly without a computer interface connection.

4.5 Connect Telephone/Network Surge Suppression (Optional)

Connect a single line telephone or a 10Base-T network cable into the telephone/network surge protection sockets on the back of the UPS. The RJ-45/RJ-11 modular combination sockets accept all standard single line telephone and 10Base-T connections. This connection will require another length of telephone cable (supplied) or network cabling (not supplied) to complete the connection.

Note: This connection is optional. It is not needed to use the UPS.

4.6 Connect to Utility



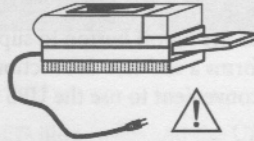
Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords and adapter plugs.

4.7 Charge the battery

The UPS charges its battery whenever it is connected to utility power. For best results, charge the battery for 4 hours before use. It is acceptable to use the UPS without first charging the battery, but on-battery run time may be reduced until the battery charges.

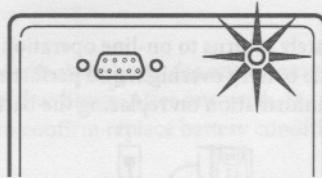
4.8 Connect the Loads

Plug the equipment you wish to protect (loads) into the output connectors on the rear of the UPS. To use the UPS as a master on/off switch, make sure that all of the loads are switched on.



Caution: Do not connect a laser printer to the UPS along with other computer equipment unless the UPS is rated 1400 VA. A laser printer periodically draws significantly more power than when idle, and may overload the UPS. Verify that the UPS can support the loads when the printer is in full operation (printing). Test the system with all loads operating to make sure that the UPS is not overloaded. See section 6.2.

4.9 Check the Site Wiring Fault Indicator



After plugging in the loads and the UPS, check the site wiring fault indicator on the rear panel. See section 3.2 for the location of the indicator on the back panel. It lights if the UPS is plugged into an improperly wired AC power outlet. Wiring faults detected include missing ground, hot-neutral polarity reversal, and overloaded neutral circuit.

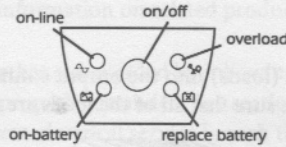
Caution: If the UPS indicates a site wiring fault, get a qualified electrician to correct the building wiring.

4.10 Plug and Play

This UPS provides optional Plug and Play installation with those computers and operating systems that support it. If you have purchased a Plug and Play UPS, a software and cable package will be included with the unit. See the documentation included in the package for more information.

5. Operation

5.1 Switch On — Switch Off



With the UPS plugged in, press and release the on/off button to supply power to the loads. The loads are immediately powered while the UPS performs a self-test. See section 5.2. Press and release the button again to turn off power to the loads. It may be convenient to use the UPS as a master on/off switch for the protected equipment.

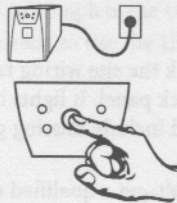
Note: The UPS is on (the internal processor is operating) whenever it is plugged in and utility voltage is present. Even when switched off the UPS maintains the battery charge.

5.2 Self-test

The UPS performs a self-test automatically when turned on and every two weeks. Automatic self-test eases maintenance requirements by eliminating the need for periodic manual self-tests.

During the self-test, the UPS briefly operates the loads on-battery. If the UPS passes the self-test, it returns to on-line operation.

If the UPS fails the self-test it immediately returns to on-line operation and lights the replace battery LED. The loads are not affected. Recharge the battery overnight and perform the self-test again. If the replace battery LED is still on, see section 10 for information on replacing the battery.



It is possible to perform a manual self-test at any time. To start a self-test:

- Press and hold the on/off button until the UPS beeps twice (about 2 seconds).
- Release the on/off button to start the self-test.

5.3 Shutdown Mode

If there is no utility power present, external devices (e. g., servers) connected to the computer interface can command the UPS to shut down. This is normally done to preserve battery capacity after the graceful shutdown of protected PC devices. In shutdown mode the UPS stops supplying power to the load, waiting for the return of utility power. The UPS alternately illuminates the upper front panel LED indicators in shutdown mode.

5.4 Cold Start

When the UPS is off and there is no utility power, it is possible to cold start the UPS to apply power to the loads from the UPS's battery.

- Press and hold the on/off button until the UPS beeps twice (about two seconds).
- Release the on/off button to start the UPS.

Note: Cold start is not a normal operating condition. On-battery and low battery alarms work as described in section 6.

6. Alarms

6.1 On Battery

In on-battery operation, the on-battery LED illuminates and the UPS sounds an audible alarm consisting of four beeps every 30 seconds. The alarm stops when the UPS returns to on-line operation.

6.2 Overload

When the UPS is overloaded (i. e., when the connected loads exceed maximum listed in section 12) the overload LED illuminates and the UPS emits a sustained tone. The alarm remains on until the overload is removed. Disconnect nonessential load equipment from the UPS to eliminate the overload. The UPS tests for overloads when operating on-battery and when performing self-tests.

6.3 Replace Battery

If the battery fails a self test, the UPS emits short beeps for one minute and the Replace Battery LED illuminates. The UPS repeats the alarm every five hours. After one week, the alarm becomes continuous. Perform the self-test procedure in Section 5.2 to confirm replace battery conditions. The alarm stops when the battery passes the self-test.

6.4 Low Battery

On-battery, when the energy reserve of the battery runs low, the UPS beeps continuously until the UPS shuts down from battery exhaustion or returns to on-line operation.

7. Options

7.1 Interface kits

For computer systems that have built-in UPS monitoring features, a series of interface kits are available to connect the UPS to your system. Each kit includes the appropriate interface cable to convert the UPS status signals into signals your system recognizes (use only factory supplied or authorized UPS monitoring cables). See your dealer or call the number at the front of this manual for more information.

7.2 Wall Mount Bracket

A special wall mount bracket is available for this UPS. See your dealer or call the number at the front of this manual for more information.

8. Troubleshooting

Problem	Possible Cause	Solution
UPS will not turn on.	On/Off button not pushed.	Press the On/Off button to power the UPS and the load.
	UPS input circuit breaker tripped.	Reduce the load on the UPS by unplugging equipment and reset the circuit breaker by pressing the plunger back in.
	Very low or no utility voltage.	Check the AC power supply to the UPS with a table lamp. If very dim or off, have the utility voltage checked.
UPS will not turn on or off.	Computer interface or accessory problem.	Disconnect the computer interface or accessory. If the UPS now works normally, check the interface cable, the attached computer, and the accessory.
UPS operates on-battery even though normal line voltage is thought to exist.	UPS's input circuit breaker tripped.	Reduce the load on the UPS by unplugging equipment and reset the circuit breaker by pushing the plunger back in.
UPS beeps occasionally.	Normal UPS operation.	None. The UPS is protecting the load.
UPS does not provide expected back up time.	The UPS's battery is weak due to recent outage or is near the end of its service life.	Charge the battery. The UPS's batteries require recharging after an extended outage. Batteries age faster when put into service often and when operated at elevated temperatures. If the battery is near the end of its service life, consider replacing the battery even if the replace battery indicator is not yet lit.
Top front panel indicators flash alternately.	The UPS has been shut down by the UPS interface kit, or by battery exhaustion.	None. The UPS will restart automatically when utility power returns.
All indicators are flashing (except On-Battery indicator).	Internal UPS fault.	Do not attempt to use the UPS. Turn the UPS off and have it serviced immediately.
The UPS operates normally, but the Site Wiring Fault indicator is lit.	Building wiring error such as missing ground or hot to neutral wire reversal.	Have a qualified electrician correct the building wiring.

Problem	Possible Cause	Solution
All indicators are off and the UPS is not operating.	The UPS is shut down and the battery is discharged from an extended power outage.	None. The UPS will return to normal operation when the power is restored and the battery has a sufficient charge.
The replace battery light is illuminated.	Weak batteries.	Allow the batteries to recharge for at least four hours. If the problem persists after recharging, replace the batteries. See section 10.
	Replacement batteries not connected properly.	Confirm the battery connections. See section 10.

9. Service

If the UPS requires service:

1. Use the troubleshooting section (section 8) to eliminate common problems.
2. Verify that no circuit breakers are tripped. A tripped circuit breaker is the most common UPS problem!
3. Go to section 5.2 and perform a manual self-test to check the battery.
4. If the problem persists, see the front of this manual for the correct telephone number and call customer service. If customer service is not available in your area, call the dealer that sold the UPS. Note the model number of the UPS, the serial number, and the date purchased. A technician will ask you to describe the problem and try to solve it over the phone, if possible. If this is not possible the technician will issue an RMA#. If the UPS is under warranty, repairs are free. If not, there will be a charge for repair.
5. Pack the UPS in its original packaging. If the original packing is not available, ask customer service about obtaining a new set. It is important to pack the UPS properly to avoid damage in transit. Never use styrofoam beads for packaging. Damage sustained in transit is not covered under warranty. Include a letter with your name, RMA#, address, copy of the sales receipt, description of the trouble, your day-time phone number, and a check (if necessary).
6. Mark the RMA# on the outside of the package. The factory cannot accept any package without this marking.
7. Return the UPS by insured, prepaid carrier to the address at the front of this manual.

10. Battery Replacement

This UPS has an easy to replace hot-swappable battery. Please read section 10.1 before performing the procedure in sections 10.3 or 10.4.

10.1 Warning

- This Uninterruptible Power Source (UPS) contains potentially hazardous voltages. Do not attempt to disassemble the unit beyond the battery replacement procedures below. Except for the battery, the unit contains no user serviceable parts. Repairs are performed only by factory trained service personnel.



- The batteries in this UPS are recyclable. Dispose of the batteries properly. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly. Refer to local codes for proper disposal requirements or return the battery to a factory authorized service center. See the instructions with the new battery for more information.



CAUTION—Do not dispose of batteries in a fire. The batteries may explode.

CAUTION—Do not open or mutilate batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.



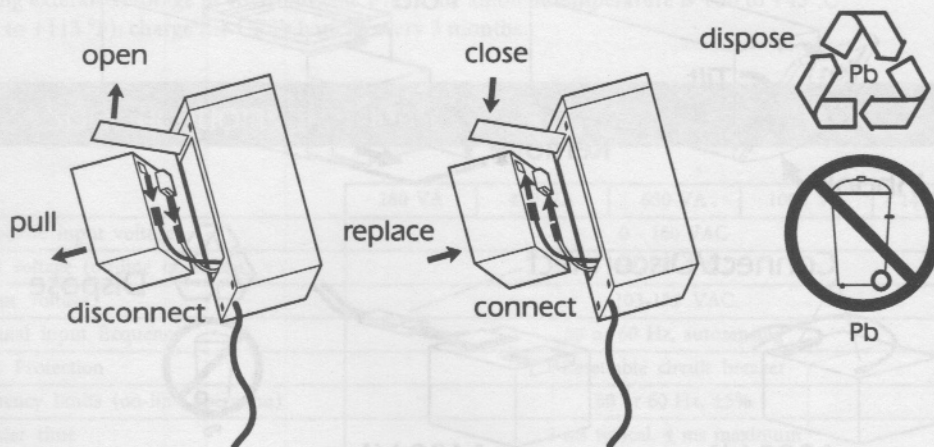
CAUTION—To avoid personal injury due to energy hazard, remove wrist watches and jewelry such as rings when replacing the batteries. Use tools with insulated handles.

CAUTION—Replace batteries with the same number and type of batteries as originally installed in the UPS.

10.2 Replacement Batteries

See your dealer or call the number at the front of this manual for information on battery recycling and replacement battery kits.

10.3 Battery Replacement Procedure (280, 420 and 650 VA models)

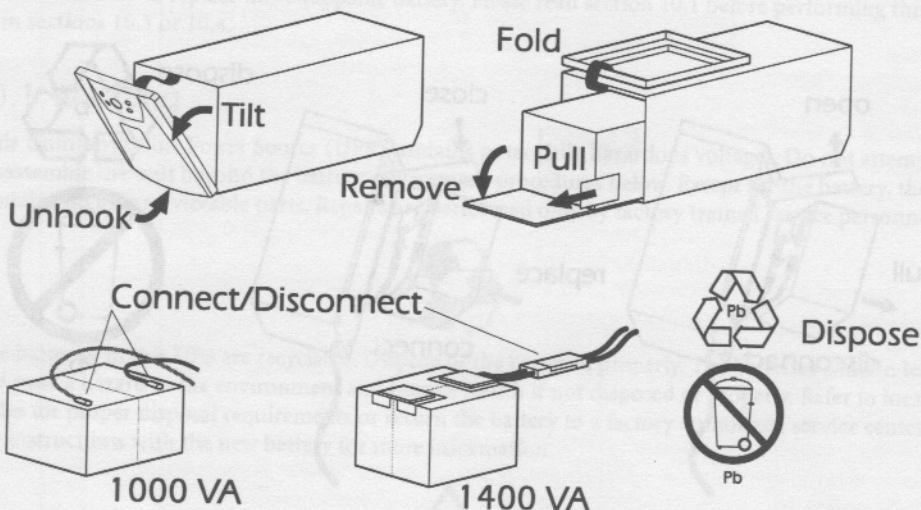


Note: Please read the cautions in section 10.1.

Battery replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and loads on for the following procedure.

1. Lay the UPS on its left side. Remove the two screws holding on the battery door and **open** the door.
Note: The battery door may need to be pulled away from the hinges somewhat to allow it to become fully swung open.
2. Gently pull out the battery by grasping the white tab.
3. Disconnect the two wires connecting the battery to the UPS. Loosen the wires by gently wiggling them while pulling straight back from the battery connector.
4. Connect the new battery in place of the old. **Note:** Small sparks at the battery connections are normal during connection.
5. Replace the new battery in the UPS. Use care to avoid pinching the wires.
6. Close the battery compartment door and replace the screws.
7. Dispose of the old battery properly at an appropriate recycling facility or return it to the supplier in the packing material for the new battery. See the new battery instructions for more information.

10.4 Battery Replacement Procedure (1000 and 1400 VA models)



Note: Please read the cautions in section 10.1.

Battery replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and loads on for the following procedure.

1. Grasp the top of the front cover and **tilt** it out and down.
2. **Unhook** the bottom of the cover from the chassis and lift it upward to expose the battery door. Be careful not to strain the ribbon cable. Do not touch the exposed printed circuit board.
3. **Fold** the front cover on top of the UPS as shown.
4. Use a screwdriver or a coin to **remove** the two battery door screws and open the door.
5. Grasp the tab and gently **pull** the battery out of the UPS.
6. **Disconnect** the battery leads.
7. **Connect** the battery leads to the new battery. **Note:** Small sparks at the battery connectors are normal during battery connection.
8. Slide the battery into the UPS, close the battery door, replace the battery compartment screws, and replace the front cover.
9. **Dispose** of the old battery properly at an appropriate recycling facility or return it to the supplier in the packing material for the new battery. See the new battery instructions for more information.

11. Storage

11.1 Storage conditions

Store the UPS covered and upright in a cool, dry location, with its battery fully charged. Before storing, charge the UPS for at least 4 hours. Disconnect any cables connected to the computer interface port to avoid unnecessarily draining the battery.

11.2 Extended storage

During extended storage in environments where the ambient temperature is -15 to $+30$ °C ($+5$ to $+86$ °F), charge the UPS's battery every 6 months.

During extended storage in environments where the ambient temperature is $+30$ to $+45$ °C ($+86$ to $+113$ °F), charge the UPS's battery every 3 months.

12. Specifications

	280 VA	420 VA	650 VA	1000 VA	1400 VA
Acceptable input voltage	0 - 160 VAC				
Input voltage (on-line operation)	92-150 VAC				
Output voltage	103-132 VAC				
Nominal input frequency	50 or 60 Hz, autosensing				
Input Protection	Resettable circuit breaker				
Frequency limits (on-line operation)	50 or 60 Hz, ±5%				
Transfer time	2 ms typical, 4 ms maximum				
Maximum load	280 VA 180 W	420 VA 260 W	650 VA 410 W	1000 VA 670 W	1400 VA 950 W
On-battery output voltage	115 VAC				
On-battery frequency	50 or 60 Hz, ±0.1 Hz				
On-battery waveshape	Stepped sine-wave			Trapezoid	
Protection	Overcurrent and short-circuit protected, latching shutdown on overload.				
Surge energy rating (one time, 10/1000 μs waveform)	320 J				
Surge current capability (one time, 8/20 μs waveform)	13kAmps maximum				
Surge response time	0 ns (instantaneous) normal mode; <5 ns common mode				
Surge voltage let-through (percentage of applied ANSI C62.41 Cat. A ±6 kV test waveform)	<5%			<0.5%	
Noise Filter	Normal and common mode EMI/RFI suppression, 100 kHz to 10 MHz				
Battery type	Spill proof, maintenance free, user replaceable, sealed lead-acid				
Typical battery life	3 to 6 years, depending on number of discharge cycles and ambient temperature				
Typical recharge time	2 to 5 hours from total discharge				
Telephone line surge protection, 1.2 μs/50 waveform.	±6kV peak				

12. Specifications (Continued)

	280 VA	420 VA	650 VA	1000 VA	1400VA
10Base-T surge protection let-through (as a percentage of an applied ±6 kV 1.2/50 μs, 125 A 8/20 μs test)	<5%				
Telephone line surge protection let-through (as a percentage of an applied ±6 kV 1.2/50 μs, 500 A 8/20 μs test)	<1%				
Operating temperature	0 to +40 °C (+32 to +104 °F)				
Storage temperature (see section 11)	-15 to +45 °C (+5 to +113 °F)				
Operating and storage relative humidity	0 to 95%, non-condensing				
Operating elevation	0 to +3,000 m (0 to +10,000 ft)				
Storage elevation	0 to +15,000 m (0 to +50,000 ft)				
Electromagnetic immunity	IEC 801-2 level IV, 801-4 level IV, 801-5 level III				
Audible noise at 1 m (3 ft)	<45 dBA			<50 dBA	
Size (H x W x D)	Model 280, 420 16.8 x 11.9 x 36.8 cm (6.6 x 4.7 14.5 in.)		16.8 x 11.9 x 36.8 cm (6.6 x 4.7 x 14.5 in.)	21.6 x 17 x 43.9 cm (8.5 x 6.7 x 17.3 in.)	
	Model 280B, 420B 15 x 8.6 x 33.8 cm (5.9 x 3.4 x 13.3 in.)				
Weight - net (shipping)	Model 280 7.2 (8.5) kg; 15.9 (18.7) lb.	Model 420 7.8 (9.1) kg 17.2 (20.0) lb.	10.9 (12.2) kg; 24.0 (26.8) lb.	19.3 (21.3) kg; 42.5 (47) lb.	24.1 (26.1) kg; 53 (57.5) lb.
	Model 280B 6.6 (7.5) kg; 14.5 (16.6) lb.	Model 420B 7.2 (8.1) kg; 15.9 (18) lb.			
Safety and approvals	UL 1778, UL 497A, CSA 22.2				
EMC verification	FCC/DOC Class B certified				

13. How to Determine On-battery Run Time

Knowing the on-battery run time of the UPS is an important part of UPS use, especially in situations where the protected device uses an operating system that requires some time to gracefully shut down.

1. To calculate the on-battery run time first determine the total load protected by the UPS in Volt-Amps. Obtain load figures from either the labelling on the protected equipment or the accompanying literature. For loads specified in watts, multiply the specified figure by 1.4. For loads specified in Amps, multiply the specified figure by 120.
2. Add the individual loads to determine the total load.
3. Compare the total load of your system to the run time table below.

Typical On-Battery Run Time Versus Load, in Minutes

Load	280 VA	420 VA	650 VA	1000 VA	1400 VA	Load	650 VA	1000 VA	1400 VA
50 VA	35	41	90	167	306	500 VA	7.2	14	29
75 VA	25	27	64	125	236	550 VA	6.5	13	26
100 VA	18	21	49	98	190	600 VA	5.8	11	23
150 VA	12	14	29	64	133	700 VA	-	9	19
200 VA	8	10	22	47	99	800 VA	-	7.7	16
250 VA	6	7.5	17	35	74	900 VA	-	6.6	13
300 VA	-	6.2	14	27	60	1000 VA	-	5.8	11
350 VA	-	5.1	11	22	50	1200 VA	-	-	8.8
400 VA	-	4.3	9.3	19	42	1400 VA	-	-	7.2
450 VA	-	-	8.2	17	35				

Consignes de sécurité importantes

Veuillez lire et consulter les consignes de sécurité, d'installation et d'utilisation qui s'y trouvent doivent être lus les fois de l'installation et de l'entretien de l'onduleur et des batteries. Elles vous aident à tirer le maximum de votre onduleur et à prolonger sa durée de vie. Le fonctionnement interne de votre onduleur vous est expliqué, ainsi que les raisons pour lesquelles il assure une excellente protection contre les perturbations électriques tels que coupures de courant, chutes de tension et surtension, intempéries de courant et interférences EMI/RFI. Ce manuel vous indique également comment remettre votre onduleur à l'état pour réparation.

Si vous rencontrez un problème avec votre onduleur, veuillez consulter le manuel avant d'appeler notre service clientèle. Le chapitre de résolution de problème (chapitre 8) peut vous aider dans la plupart des situations rencontrées.

Veuillez conserver l'emballage de votre onduleur

L'emballage de votre onduleur a été spécialement conçu pour le protéger pendant le transport. Il est d'une grande importance que vous le conserviez et que vous l'utilisiez en cas de retour de l'appareil pour réparation. Les dommages subis pendant le transport ne sont pas couverts par la garantie.

English

Français

Español



AMERICAN POWER CONVERSION

The world's most reliable
power protection

"Equipment Protection Policy"

Whereas,
APC is committed to innovative solutions to real customer problems through engineering excellence and...

Whereas,
APC offers the most cost effective, reliable power protection product available...

Therefore,
let it now be known to all parties, that from this day forward, American Power Conversion Corp.
demonstrates its commitment to guarantee customer confidence and user peace of mind.

American Power Conversion will repair or replace any
equipment damaged by a surge or spike while properly connected to
an APC unit covered by the Equipment Protection Policy*

APC

AMERICAN POWER CONVERSION

132 Fairgrounds Road, W. Kingston, RI 02892

* Certain legal restrictions apply, see reverse side for details.

Rodger B. Dowdell Jr.

Rodger B. Dowdell Jr., CEO, President

American Power Conversion's "Equipment Protection Policy"

THIS POLICY IS NOT A WARRANTY. REFER TO THE APC LIMITED WARRANTY FOR INFORMATION CONCERNING THE WARRANTY FOR YOUR APC PRODUCT. THE LIMITATIONS AND CONDITIONS CONTAINED IN THIS POLICY DO NOT AFFECT THE TERMS OF THE WARRANTY.

"Equipment Protection Policy"

In the USA and Canada Only for 120 Volts Products¹

If your electronic equipment is damaged by power line transients on an AC power line (120 Volt - see Note 1 below) while directly and properly connected to a standard APC product covered by the Equipment Protection Policy ("connected equipment"), and if all of the remaining conditions specified below are met, APC will, at APC's sole option, during the period specified below only, replace the APC product and either (a) pay for the repair of the connected equipment or (b) reimburse you for the fair market value, as determined by the then current price list of the Boston Computer Exchange (or equivalent), of the connected equipment, in an amount not to exceed the dollar limits stated below, if APC determines that the damage was caused by the failure of the APC product to protect against power line transients and/or where applicable, data line, telephone or CATV line transients. Power line transients that APC products have been designed to protect against, as recognized by industry standards, include spikes and surges on AC power lines. Protection from telephone line transients applies only to APC products which offer modem or fax line protection, and in cases in which such protection is available, telephone service equipment must include a properly installed and operating "primary protection" device at the service entrance (such devices are normally added during telephone installation) in order to be covered for telephone line transients. Protection of CATV (Cable Television) connected equipment from transients applies only to APC products which offer such protection, and in such cases, the CATV service must be properly grounded according to the codes set forth in the National Electrical Code (NEC) in order to be covered for CATV transients. Protection from data line transients applies only to APC UPS products which offer data line protection. This policy does not apply to the APC ProtectNet products. If you own APC ProtectNet products, please refer to the Supplemental Equipment Protection Policy included with your ProtectNet products.

APC reserves the right to determine whether the damage to the connected equipment is due to APC product failure by requesting that damaged equipment be sent to APC for inspection. This policy is in excess of, and applies only to the extent necessary beyond, any coverage for the connected equipment provided by other sources, including, but not limited to, any manufacturer's warranty, extended warranty coverage and home owner's insurance.

Equipment Protection Policy Dollar and Period Limits

For customers that meet the qualifications and conditions set forth in this policy, APC will provide reimbursement (cost of repair or fair market value) during the period limits and up to the dollar limits stated as follows:

Product ²	Dollar Limit	Period ³
Surge Models	\$250	3 years
Personal SurgeArrest Models	\$2,500	Lifetime
Professional SurgeArrest Models	\$10,000	Lifetime
Network SurgeArrest Models	\$25,000	Lifetime
Performance SurgeArrest	\$25,000	Lifetime
PowerManager Models	\$25,000	Lifetime
Personal PowerManager Models	\$2,500	Lifetime
Personal PowerCell	\$2,500	3 years
Professional PowerCell	\$10,000	3 years
Network PowerCell	\$25,000	3 years
Line-R, Standard 120 Volts	\$25,000	Lifetime
Back-UPS, Standard 120 Volts	\$25,000	Lifetime
Back-UPS Pro, Standard 120 Volts	\$25,000	Lifetime
Smart-UPS, Standard 120 Volts ¹	\$25,000	Lifetime
Smart-UPS VS, Standard 120 Volts ¹	\$25,000	Lifetime
Matrix-UPS, Standard 208/240 Volts	\$25,000	Lifetime
Synergi	\$25,000	Lifetime

Note 1: Standard 208 V Smart-UPS products are included.

Note 2: "Standard" (or "Std.") is defined as excluding all "X-option" products.

Note 3: "Lifetime" period is the life of the product while owned by the original purchaser ("you" or "purchaser"). Other period limitations are from the date of purchase.

Eligibility for coverage under the Equipment Protection Policy:

1. You must register the product by returning to APC the warranty card provided with the product within 10 days of purchase. All information must be filled in, and you should retain a copy for your records.
2. All connected equipment must be UL or CSA approved.
3. The APC product must be plugged into properly wired and grounded outlets; no extension cords, adapters, other ground wires, or electrical connections may be used, with the sole exception of other standard APC 120 Volt¹ products. The installation must not include power protection products made by any manufacturer other than APC. The installation must comply with all applicable electrical and safety codes set forth pursuant to the most current National Electrical Code (NEC).
4. Any claim under the Equipment Protection Policy must be made within 10 days of the date of alleged damage to the connected equipment.
5. The Equipment Protection Policy covers only standard APC 120 Volt¹ products used in the United States and/or Canada.

What is not covered under the Equipment Protection Policy:

1. DAMAGE TO ELECTRONIC EQUIPMENT RESULTING FROM TRANSIENTS ON DATA LINES IS NOT COVERED UNLESS THE UPS OR SURGE PRODUCT OFFERS SUCH PROTECTION.
2. Restoration of lost data and reinstallation of software are not covered.
3. This policy does not cover damage from a cause other than AC power line transients, except for damage due to data line,

telephone line or CATV transients, which is covered only if the APC product offers such protection and the unit is properly utilized.

In addition, the following are expressly excluded from coverage:

4. DAMAGE CAUSED BY FAILURE TO PROVIDE A SUITABLE INSTALLATION ENVIRONMENT FOR THE PRODUCT (INCLUDING, BUT NOT LIMITED TO, LACK OF A PROPER SAFETY GROUND).
5. Damage caused by the use of the APC product for purposes other than those for which it was designed.
6. Damage caused by accidents, or disasters such as fire, flood, or wind.
7. Damage caused by abuse, misuse, alteration, modification, or negligence.
8. This policy is null and void if, in APC's view, the APC product has been tampered with or altered in any way.
9. EXCEPT AS EXPRESSLY PROVIDED IN THIS POLICY, IN NO CASE SHALL APC BE LIABLE UNDER THE TERMS OF THIS POLICY FOR ANY DAMAGES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR MULTIPLE DAMAGES ARISING OUT OF THE USE OF THE APC PRODUCT OR DAMAGE TO THE CONNECTED EQUIPMENT, REGARDLESS OF THE LEGAL THEORY ON WHICH SUCH CLAIM IS BASED, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. SUCH DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, LOSS OF PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF USE OF THE APC PRODUCT OR THE CONNECTED EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, LOSS OF SOFTWARE, COST OF CAPITAL, COST OF ANY SUBSTITUTE EQUIPMENT, FACILITIES OR SERVICES, DOWNTIME, THE CLAIMS OF THIRD PARTIES, INCLUDING CUSTOMERS, AND INJURY TO PROPERTY.

Submitting an Equipment Protection Policy Claim:

1. If all of the conditions for coverage are satisfied, call the APC customer service department at (800) 800-4APC and obtain an EPP RMA (Equipment Protection Policy Returned Material Authorization) number. APC will forward to you an Equipment Protection Policy claim form, which must be completed and filed within 30 days.
2. Mark the Equipment Protection Policy RMA number on the APC product you are returning.
3. Pack the APC product in its original packaging (or request packing materials from APC if the packaging has been discarded). Enclose the completed Equipment Protection Policy claim form and a copy of your sales receipt for the APC product in box.
4. Mark the EPP RMA number clearly on the outside of box.
5. Ship the product (one way shipping charges paid by you) to:

American Power Conversion
Dock 1
2000 Plainfield Pike
Cranston, RI 02921
Attn: EPP RMA# _____

6. APC will evaluate the product to determine its level of functionality, and will examine the product for evidence of damage from AC power line transients (data line, telephone line or CATV transients, if applicable). (A) If APC's evaluation provides no evidence of damage from power line transients (data line, telephone line or CATV transients, if applicable), APC will send to the customer (i) a report summarizing the tests performed and (ii) a rejection of claim notice. (B) If the APC product shows evidence of damage from power line transients (data line, telephone line or CATV transients, if applicable), APC will request that all connected equipment for which an Equipment Protection Policy claim has been submitted, be sent for evaluation to either APC or an authorized service center. If it is determined that the connected equipment has been damaged from AC power line transients (data line, telephone line or CATV transients, if applicable), APC will, in its discretion, either authorize you to have the equipment repaired or reimburse you for the fair market value of the damaged equipment, up to the dollar limits stated above. Please save the damaged connected equipment or all damaged parts.

7. If you are authorized by APC to have the connected equipment repaired, the repair must be performed at a service center that is authorized by the manufacturer of the connected equipment. APC reserves the right to contact the authorized service center directly to discuss repair costs and damage to the connected equipment to determine if it was caused by AC power line transients (data line, telephone line or CATV transients, if applicable) and the right to request that the service center forward the connected equipment or components of the connected equipment to APC for inspection. Please notify the service center to save all damaged parts.

8. APC will, after determining that the damage was caused by the failure of the APC product to protect against AC power line transients (data line, telephone line or CATV transients, if applicable), issue payment to you, in its sole discretion, for either costs of repair or the fair market value of the connected equipment, up to the dollar limits stated above. APC reserves the right to require you to transfer title and deliver the connected equipment to APC if it chooses to reimburse you for the fair market value of the connected equipment.

9. Unless modified in a writing signed by APC and you, the terms of this policy are understood to be the complete and exclusive agreement between the parties, superseding all prior agreements, oral and written, and all other communications between the parties relating to the subject matter of this agreement. No employee of APC or any other party is authorized to make any representations beyond those made in this agreement concerning the Equipment Protection Policy.

APC
AMERICAN POWER CONVERSION

132 Fairgrounds Road
West Kingston, RI 02892

Tel: (800)800-4APC / (401)789-5735 / Fax: (401)789-3710